1-1916

Comparative Yields of Hay, from Several Varieties and Strains of Alfalfa, at Brookings, Highmore, Cottonwood and Eureka

A.N. Hume

Manley Champlin

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AGRICULTURAL EXPERIMENT STATION

SOUTH DAKOTA
STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS

AGRONOMY DEPARTMENT

COMPARATIVE YIELDS OF HAY, FROM SEVERAL VARIETIES AND STRAINS OF ALFALFA, AT BROOKINGS, HIGHMORE, COTTONWOOD AND EUREKA.

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Vivian .....Lyman County

SUMMARY OF BULLETIN 163.

1. In the following pages, the results of field tests of alfalfa are put down separately for each of the several fields, operated by the Experiment Station.

Certain strains of alfalfa have been tested under field conditions at four fields, for three years—1913-1915 inclusive. The average yields of these strains, at the several fields are so made up that they, in turn, may be tentatively averaged, in order to get some indication as to which one of the strains may be adapted to general conditions.

The following table makes such a summary of average yields for the several fields:

TABLE.

RELATIVE YIELDS FOR YEARS 1913-1915 IN TONS OF FIELD-CURED HAY PER ACRE, OF GIVEN STRAINS AT POINTS INDICATED.

Name of Variety	S. D. No.	S. P. I. No.	Average Yield for Years 1913-1915				General Average
			Brookings	Highmore	Eureka	Cottonwood	
Vale	22		3180	2213	2502	2365	2565
Grimm	162	29988	2917	2470	2481	2260	2532
Turkestan	240	991	3117	2278	2159	2555	2527

It is reasonable for the present and until further data are available to conclude that neither one of the three strains put down in the above table of averages, claims very decided advantage over the others in hay production for the general conditions of South Dakota. With this in mind they may be recommended in the following order: Vale S. D. No. 22; Grimm S. D. No. 162, S. P. I. No. 29988; Turkestan S. D. No. 240, S. P. I. No. 991.

Pages 291, 296, 298, 299.

2. It should be clearly understood that the tabulation of yields given above does not imply that these three strains should be produced in South Dakota to the exclusion of all others. Baltic S. D. No. 167, S. P. I.

No. 25537; Common S. D. No. 12; Kansas Non-irrigated S. D. No. 173, S. P. I. No. 19508; and others, now in the hands of successful growers should not be hastily discarded. Page 284.

3. Although Turkestan alfalfa is adapted to hay production in South Dakota, along with Grimm and Vale, it should be kept in mind that Turkestan seed is discriminated against in some eastern markets, while the other strains are not. Page 301.

4. Field trials of strains of Medicago falcata, so far completed at Brookings, indicate that the species may not yield as large amounts of hay as an average, as strains of Medicago sativa that have so far been tried. Page 293.

5. Index of numbered strains listed in this bulletin. Page 284.

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239	29212	"	Northern	290, 291
240	991	"	Turkestan	282, 283, 290, 291, 292, 294, 295, 296, 297, 298, 299, 300, 308, 309, 310
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654	35086	"	"	325
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761	31944	sativa	Indian	325

South Dakota Numbers	Serial Plant Introduction Numbers	Species of Alfalfa	Common Name	Page of this Bulletin
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763	25244	sativa	Grimm	313
764	22558	sativa	Common	316
765	28938	falcata	Turkey	337
766	28908	sativa	Chinese	326
767	34649	falcata	Indian	337
768	22788	sativa	Turkestan	311
769	30009	falcata	Indian	338
770	27204	sativa	Mongolian	326
891	25537	sativa	Baltic	314
892	18629	"	Common	322
896	29986	"	Grimm	313
897	31939	"	Indian	326
902	22559	"	Common	322
903	28037	"	Russian	326
905	31813	"	Turkestan	311
906	32279	"	Common	322
907	29140	"	Indian	326
909	31333	"	Turkestan	310
910	21022	"	Common	322
913	25192	"	Turkestan	310
914	27214	"	"	309
915	26117	"	Grimm	313
916	29353	"	Common	322
918	20896	media	French	342
919	24603	"	German	342
921	27234	sativa	Common	322, 323
922	27224	"	Russian	326, 327
924	27237	"	Common	316
925	26860	"	Common	323
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COMPARATIVE YIELDS OF HAY FROM SEVERAL VARIETIES AND STRAINS OF ALFALFA AT BROOKINGS, HIGHMORE, COTTONWOOD, AND EUREKA.

BY A. N. HUME AND MANLEY CHAMPLIN.

The general fact, that alfalfa is one of the staple crops in South Dakota, is well established. It is sound advice to say that every farmer within the state should seriously consider the desirability of seeding alfalfa on his farm. Such facts have come to be a matter of general information and need not here be greatly extended.

The facts which still need to be discovered concerning the most successful production of alfalfa in South Dakota are in the main those which can only be determined by painstaking research and observation. As an example of this, there are many varieties and strains of alfalfa now growing within the borders of this state, but there is much to learn about each of these many varieties and strains before growers may know just which ones are sure to produce the most profitable yields in their various areas on their various farms. In the latter part of this bulletin, a classified list of a number of these varieties with names and histories is put down.

In order to secure definite data concerning hay yields, which several of the most prominent strains of alfalfa in the state will produce, the Agronomy Department has conducted on the several state fields, namely, at Brookings, Highmore, Cottonwood and Eureka, comparative tests for securing yields of hay under field conditions. These trials have been conducted on plots one-tenth acre in size. Although such a plot is not large, it is representative of field conditions, and furthermore gives opportunity for comparing yields from several kinds of alfalfa within a reasonable space.

YIELDS OF ALFALFA HAY FROM BROOKINGS FIELD.

Bulletin No. 133 of the South Dakota Experiment Station summarizes comparative yields of alfalfa secured by the experiment station, previous to the year 1912, namely, up to and including the season 1911. In the bulletin mentioned a summary of average yields was published from the field at Brookings covering the period of four years ending with 1911. Attention was called to the fact that for the experiment in question there was "nothing to indicate that the source of the seed used on the several plots had any great influence on yields of hay with the possible exception of the French seed." This was for the reason that the differences in average yields of these several strains tested at Brookings field in the four-year test were not great.

The strains tested, in order of average yields were as follows: Turkestan, S. D. No. 2, S. P. I. No. 11211; Nebraska, S. D. No. 9, S. P. I. No. 12820; New York, S. D. No. 10 S. P. I. No. 13291; Texas, S. D. No. 7 S. P. I. No. 12801; Northern Montana, S. D. No. 23 S. P. I. No. 12816; Utah, S. D. No. 1 S. P. I. No. 12409; Montana, S. D. No. 6 S. P. I. No. 12747; and French, S. D. No. 5 S. P. I. No. 12695.

During the years 1908-1912, inclusive, alfalfa hay was produced at Brookings from plots 370-379. Three of these plots, namely, 370, 371, and 372 were seeded in the year 1908 and were accordingly harvested in 1909 and in the years following. The plots in question were reported upon in Bulletin No. 133, page 261. However, in 1909 the seven remaining plots of acre 370-379 were also seeded to alfalfa. Evidently the yields from the ten plots are made up of two series—the first three being not strictly comparable with the seven last. They are similar, however, to the extent that all are plots of rather uniform soil type, which during the years 1910-1912 were all occupied with successful stands of alfalfa—the first three having been seeded one year earlier than the others.

The following Table No. I. summarizes the yields for the several years and also gives the average yields for the ten plots during the years 1910-1912.

TABLE I.

YIELDS OF ALFALFA HAY FROM SEVERAL STRAINS

BROOKINGS FIELD 1909-1912.

Plot No.	Variety	S. D. No.	S. P. I No.	Yields				
				1909	1910	1911	1912	Average 1910-1912
370	Kansas Non-irrigated	173	19508	4000	2160	740	10140	4347
371	Turkestan	171	20988	3150	2310	940	7120	3457
372	Montana	170	21827	3250	2400	1150	8290	3947
373	Turkestan	171	20988		2940	1090	6240	3423
374	French	175	22636		3010	930	6050	3330
375	German	176	25022		3460	1020	6260	3580
376	German	179	23481		3130	1000	5540	3223
377	Minnesota Grimm	180	21735		2143	780	5590	2838
378	Montana	181	23454		2710	960	5170	2947
379	Turkestan		23202		2740	900	5760	3133

Plots 370, 371, and 372 were seeded in 1908. The others were fall plowed in 1908.

It may be noted from the table above that the average yields of the several strains rank in the following order: Kansas Non-irrigated, S. D. No. 173, S. P. I. No. 19508; Northern Montana, S. D. No. 170, S. P. I. No. 21827; German, S. D. No. 176, S. P. I. No. 25022; Turkestan, S. D. No. 171, S. P. I. No. 20988; French, S. D. No. 175, S. P. I. No. 22636; German, S. D. No. 179, S. P. I. No. 23481; Turkestan, S. D. No....., S. P. I. No. 23202; Northern Montana, S. D. No. 181, S. P. I. No. 23454; and Minnesota Grimm, S. D. No. 180, S. P. I. No. 21735.

These tests, however, in addition to those reported in Bulletin No. 133 and previously, make it evident that there are several strains of alfalfa, which though they may not be equally productive will usually withstand seasonal conditions in the area of Brookings and make satisfactory returns. It remains to continue the field tests of alfalfa under conditions at Brookings until yields enough shall be established to make average returns dependable, as evidence of superiority of one or more of these several strains over the others.

More recently yields of alfalfa hay have been secured from the one-tenth-acre plots of acre 670-679, West Farm, Brookings. These plots were seeded in the spring of 1912 with a nurse crop of Sixty Day oats. It is worth noting that this is an early variety of oats, which produces a comparatively small yield of straw and leaves and apparently does not shade the ground to such a great extent as some of the other varieties. As a nurse crop for the alfalfa, it was seeded thinly, namely, five pecks per acre. In 1912 the oats was harvested for grain, the average yield of the several plots being about seventy bushels.

In the present connection, it is especially noted that the plots of alfalfa made a satisfactory stand. They were not harvested for hay in 1912, although after the cutting of the oats, the alfalfa made considerable growth. Subsequent to 1912 these alfalfa plots have been harvested for yields of hay for three seasons.

The following Table II. gives a summary of the yields from the several plots for the separate seasons and also the averages:

TABLE II.

COMPARATIVE YIELDS OF ALFALFA HAY FROM ONE-TENTH-ACRE PLOTS, BROOKINGS FIELD, 1913-1915.

Plot No.	Variety	S. D. No.	S. P. I. No.	Yield of air-dry hay in pounds per acre			
				1913	1914	1915	Average
670	Vale	22		1490	2950	4640	3027
671	Utah	229	22559	1020	1150	3800	1990
672	Grimm	236	29988	1480	2800	4470	2917
673	Vale	22		1480	3100	4960	3180
674	Turkestan	240	991	1490	2950	4910	3117
675	Northern	239	29212	1550	2550	4630	2910
676	Vale	22		1720	2000	5240	2986
677	Minnesota Grimm	247	27889	1450	2700	4610	2920
678	Sand Lucern	249	30490	1490	2350	3900	2580
679	Vale	22		1840	3200	5540	3527

It may be noted from the above table that Vale S. D. 22 was the variety used on the "check" plots. By examining the several plots of Vale, it may also be noted that the soil was apparently somewhat more productive in the direction of the ascending numbers of the plots. This would be in accord with what is known of the character of the plots themselves. As a whole, however, the plots in question are apparently fully as uniform in character as field plots generally are.

The weights of hay put down for the year 1913 are those of the first cutting. The several plots were in fact harvested for seed at the second cutting and threshed. The weights of straw and seed were recorded. It was noted, however, that the straw was very largely made up of Russian thistles. It is believed that although the use of the weights of only the first cutting as put down makes the yield appear light, nevertheless it is more accurate for purposes of comparing the several strains

than it would be if the weights of the second cutting were added thereto.

In order to make comparison somewhat more easy the yields of the several strains are re-arranged in the following Table III. In this table the yields of Vale, S. D. 22 are put down for each year as the average yield of all plots of that strain for that year.

TABLE III.

COMPARATIVE YIELDS OF ALFALFA HAY FROM SEVERAL STRAINS, BROOKINGS FIELD, 1913-1915.

Variety	S. D. No.	S. P. I. No.	Yield of air-dry hay in pounds per acre			
			1913	1914	1915	Average
Vale	22		1632	2812	5095	3180
Turkestan	240	991	1490	2950	4910	3117
Minnesota Grimm	247	27889	1450	2700	4610	2920
Grimm	236	29988	1480	2800	4470	2917
Northern	239	29212	1550	2550	4630	2910
Sand Lucern	249	30490	1490	2350	3900	2580
Utah	229	22559	1020	1150	3800	1990

From Table III above it may be readily observed that the averages of the several strains rank from highest to lowest as follows: Vale, S. D. 22; Turkestan, S. D. 240 S. P. I. 991; Minnesota Grimm, S. D. 247; S. P. I. 27889; Grimm, S. D. 236, S. P. I. 29988; Northern, S. D. 239, S. P. I. 29212; Sand Lucern, S. D. 249, S. P. I. 30490; Utah, S. D. 229, S. P. I. 22559.

STRAINS OF ALFALFA THAT HAVE YIELDED HIGHEST IN THE SEVERAL TESTS AT BROOKINGS.

The several variety tests of alfalfa above given for hay-production at Brookings field may be thus summarized:

The strains that have stood first and second in average yield of cured hay, at Brookings field according to the yields of hay are:

Kansas		
Non-irrigated	S. D. No. 173	S. P. I. No. 19508
Turkestan	S. D. No. 2	S. P. I. No. 11211
Vale	S. D. No. 22	
Montana	S. D. No. 170	S. P. I. No. 21827
Nebraska	S. D. No. 9	S. P. I. No. 12820
Turkestan	S. D. No. 240	S. P. I. No. 991

It would be indicated therefore that any one of the above strains would be adapted for sowing to produce hay in the area represented by Brookings.

YIELDS OF HAY FROM STRAINS OF MEDICAGO FALCATA BROOKINGS.

At Brookings during six successive years, yields of field-cured hay have been secured from two one-tenth acre plots of the "West Farm".

One plot, No. 645, was seeded in 1909 to Obb S. D. No. 42, S. P. I. No. 24452. One plot, No. 649, was seeded in 1909 to S. D. No. 47, S. P. I. No. 20717 Kharkov.

These two plots produced yields of hay each of the six years 1910-1915 inclusive. The two plots were not originally in a series though they are similar plots. The yields are put down not more for comparison with one another than as an indication of hay yields secured from strains of Medicago falcata. It will be noted from the following table that Siberian S. D. No. 526, also a strain of Medicago falcata failed to make a continuous stand.

The yields of the strains in question are summarized as follows:

YIELDS OF FIELD-CURED HAY FROM STRAINS OF MEDICAGO FALCATA IN POUNDS OF HAY PER ACRE.

Name of Variety	S. D. No.	S. P. I. No.	Yield of field-cured hay per acre in given year						
			1910	1911	1912	1913	1914	1915	Av.
Obb	42	24452	2780	88	4819	2720	2580	4200	2865
Kharkov	47	20717	1624	270	2681	1720	4040	1940	2046
Siberian	526	34116	Stand failed	- -	- -	Seeded with Barley	300		

It may be stated here that these yields of hay from strains of Medicago falcata were produced from one cutting. It is the observation of the writers that several of the strains of Medicago falcata will fail to recover after the first cutting of hay during any given season. Usually they do not produce a second or third cutting, as do most of the strains of Medicago sativa.

On page 288, table I. of this bulletin are put down yields of hay from several plots and several strains of Medicago sativa at Brookings for years 1909-1912 inclusive.

On page 290 are yields of Medicago sativa for years 1913-1915 inclusive. The average yields of all these strains of Medicago sativa for each of the separate years will serve to indicate what that species might be expected to produce of hay—keeping in mind that only one cutting was hay in 1913, the second being seed.

The following are the average yields of hay per acre for the separate years: 1909, 3467 pounds; 1910, 2700 pounds; 1911, 951 pounds; 1912, 6616 pounds; 1913, 1445 pounds; 1914, 2473 pounds; 1915, 4487 pounds.

The average yield of field-cured hay, from these several strains of Medicago sativa for the years indicated, in addition to the crop of seed referred to was 3163 pounds per acre. At present writing, there is no strain of any other species which seems likely to displace some strains of Medicago sativa, for hay yields at Brookings.

YIELDS OF ALFALFA HAY FROM HIGHMORE FIELD.

In bulletin No. 133, yields of alfalfa hay were published, which had been secured previous to 1911. In Table V. (Page 264) of the bulletin, in question, attention was especially called to the fact that two strains of alfalfa, namely Oasis, S. P. I. 12816, and Tripoli, S. P. I. 12847 were completely winter-killed in 1906. Adjoining plots persisted; a fact which led to the conclusion that the strains with which they were seeded were hardy, in comparison with the ones above.

The three strains that thus persisted throughout the years 1905-1911 at Highmore, named in order of average yield were Turkestan S. D. 240, S. P. I. 991; Turkestan S. D. 203, S. P. I. 13436 and Arabian S. D. 202, S. P. I. 12992. The last named strain yielded decidely less than either of the strains of Turkestan. Thus of the five strains in this particular test, only two, both Turkestan, were apparently hardy, under the conditions at Highmore.

At the time of publication of Bulletin No. 133 a comparative test of five strains of alfalfa under field conditions was under way which was continued some years later. The yields from the five strains in these tests are summarized in the following Table IV.:

TABLE IV.

YIELDS OF HAY FROM FIVE STRAINS OF ALFALFA, HIGHMORE, 1909-1913.

Plot No.	Name of Variety	No. of Strains		Yields of Hay — Pounds Per Acre					
		S. D.	S. P. I.	1909	1910	1911	1912	1913	Average
147	Montana Grimm	170	21827	1255	400	1130	00	950	747
148	German.....		21269	1900	900	1490	00	900	1038
149	German.....		21217	1230	800	1630	00	960	924
150	Turkestan.....	171	20988	1170	550	1330	00	1180	846
151	Kansas.....	173	19508	1650	600	2130	00	1500	1176

In two of the five years, of the table above, the highest yield of hay was produced by Kansas, S. D. 173, S. P. I. 19508, and in the other two years this same strain ranked either second or third. Likewise in two of the five years German, S. P. I. No. 21269 ranked first, but in the other two it was either third or fifth. No other strain ranked first in any of the five years.

The strains of the above table ranked in order of average yield as follows: Kansas, S. D. No. 173, S. P. I. 19508; German, S. D. No....., S. P. I. 21269; German, S. D. No....., S. P. I. 21217; Turkestan, S. D. No. 171, S. P. I. 20988; Montana Grimm, S. D. No. 170, S. P. I. 21827.

Since Bulletin No. 133 was issued the growing of several strains of alfalfa under field plot conditions has been continued at Highmore.

In the spring of 1912 on acre 621-631, ten plots were seeded. These plots included the following strains: Vale, S. D. 22, Turkestan, S. D. 240, Grimm, S. D. 162. These plots failed to secure a satisfactory stand, owing apparently to seasonal conditions. The same plots and the same strains were reseeded in 1913, with the same result—no stand. Again they were re-seeded in 1914, successfully, so that in the present season 1915, comparative yields are being secured.

The 1915 yields from these plots are put down in the following Table V:

TABLE V.

COMPARATIVE YIELDS OF ALFALFA HAY—HIGHMORE

Plot No.	Name of Variety	No. of Strains		Yield in pounds of field-cured hay per A		
		S. D.	S. P. I.	1913	1914	1915
621	Vale	22				7820
622	Grimm	162	29988			7280
623	Turkestan	240	991			6880
624	Common	12				6210
625	Vale	22				6810
626	Vale	22				6840
627	Grimm	162	29988			7540
628	Turkestan	240	991			6790
629	Common	12				5760
630	Vale	22				5090

From the above table, the following table is compiled, for the purpose of making it easier to get direct comparison between the average hay yields per acre of the strains tested.

TABLE VI.

AVERAGE YIELDS OF FIELD-CURED HAY PER ACRE FROM FOUR STRAINS OF ALFALFA TESTED AT HIGHMORE. COMPILED FROM TABLE V.

Name of Variety	No. of Strains		Yield in pounds of field-cured hay per acre		
	S. D.	S. P. I.	1913	1914	1915
Grimm	162	29988			7410
Turkestan	240	991			6835
Vale	22				6640
Common	12				5985

It appears from the above averages that in the one year test given, the hay yields of the varieties ranked in the following order: Grimm, S. D. No. 162, S. P. I. No. 29988; Turkestan, S. D. No. 240, S. P. I. No. 991; Vale, S. D. No. 22; Common, S. D. No. 12.

STRAINS OF ALFALFA THAT HAVE YIELDED HIGHEST IN THE SEVERAL TESTS AT HIGHMORE.

The several variety tests of alfalfa given in the foregoing for hay-production at Highmore field, may be summarized, by naming the strains that have stood first and second as follows:

RANKED FIRST

Turkestan	S. D. No. 240	S. P. I. No. 991
Kansas	S. D. No. 173	S. P. I. No. 19508
Grimm	S. D. No. 162	S. P. I. No. 29988

RANKED SECOND

Turkestan	S. D. No. 203	S. P. I. No. 13436
German	S. D. No. ...	S. P. I. No. 21269
Turkestan	S. D. No. 240	S. P. I. No. 991

COMPARATIVE ALFALFA YIELDS FROM EUREKA.

In 1912, at Eureka, acre 121-130 was seeded to alfalfa. Certain of the plots were inoculated, certain ones were manured, and certain ones were both manured and inoculated. The following Table VII. gives the actual yields of the several plots with the names of the varieties grown thereon and the treatment with respect to inoculation or manure, or both.

TABLE VII.

YIELDS OF ALFALFA HAY FROM PLOTS AT EUREKA WITH TREATMENT OF PLOTS.

No. of Plot	Name of Variety	No. of Strains		Treatment of Plot	Yield—pounds of field-cured hay per A.			
		S. D.	S. P. I.		1913	1914	1915	Average
121	Vale	22		Inoculated	360	240	7500	2700
122	Turkestan	240	991	Manured	600	210	6000	2270
123	Grimm....	162	29988	Manured	1200	250	8050	3167
124	Vale	22		Manured	1160	240	7600	3000
125	Vale	22		Inoculated	200	160	4700	1687
126	Vale	22		Inoculated	260	160	4400	1607
127	Vale	22		Inoculated and Manured	200	165	5650	2005
128	Grimm....	162	29988	Inoculated and Manured	300	135	4950	1795
129	Turkestan	240	991	Inoculated and Manured	180	115	5850	2048
130	Vale	22		Inoculated	40	75	5650	1922

The following Table VIII. is computed from Table VII. and is arranged to express the average yields of the strains tested. The average yield for each year is found by adding the yield of the plot "manured" and the yield of the plot "inoculated and manured," and dividing the sum by two.

TABLE VIII.

AVERAGE YIELDS OF THREE STRAINS OF ALFALFA PRODUCED AT EUREKA.

Name of Variety	No. of Strains		Yield—pounds of field-cured hay			
	S. D.	S. P. I.	1913	1914	1915	Average
Vale	22		680	202	6625	2502
Grimm	162	29988	750	193	6500	2481
Turkestan	240	991	390	162	5925	2159

From the above table, for the three years given, it is clear that the three strains tested, in order of average yield of hay rank as follows: Vale, S. D. No. 22; Grimm, S. D. No. 162, S. P. I. No. 29988; Turkestan, S. D. No. 240, S. P. I. No. 991. It may be well also to note that the difference in yield between Vale, S. D. No. 22 and Grimm S. D. No. 162 as above put down is very slight.

YIELDS OF ALFALFA HAY FROM COTTONWOOD FIELD.

The Cottonwood Substation was established, so far as crop trials are concerned, in 1908. Some trials of alfalfa were attempted on new ground during the years 1909-1911 inclusive. Owing to the newness of the conditions and the extreme drought, especially in 1911, these trials met with indifferent success.

In the spring of 1912 a comparative test of three varieties was established on acre 201-210. These plots were seeded in the spring on land which was spring-plowed six inches deep, thoroughly double disked, rolled and harrowed. Alfalfa had failed to make a stand on this same acre in the season 1911.

The seeding of 1912 was successful. Obviously the new crop was not harvested for hay in the same year when it was sown. Crops of hay have been taken from the land, however, in the succeeding seasons.

The yields of hay from the several plots are put down in the following Table IX.

TABLE IX.

COMPARATIVE YIELDS OF HAY—COTTONWOOD

Plot No.	Name of Variety	No. of Strains		Treatment of Plot	Yields of hay—pounds per acre			
		S. D.	S. P. I.		1913	1914	1915	Average
201	Vale	22		Inoculated	900	1100	3880	1960
202	Turkestan	240	991	Manured	1000	1200	5860	2687
203	Grimm....	162	29988	Manured	1000	1300	4640	2313
204	Vale	22		Manured	1100	1150	4900	2383
205	Vale	22		Inoculated	850	1000	4050	1967
206	Vale	22		Inoculated	650	1050	4660	2120
207	Vale	22		Inoculated and Manured	1000	1400	4640	2347
208	Grimm....	162	29988	Inoculated and Manured	1000	1100	4520	2207
209	Turkestan	240	991	Inoculated and Manured	950	1300	5020	2423
210	Vale	22		Inoculated	750	800	4400	1983

The yields put down in Table IX. are summarized for easier comparison in Table X.

TABLE X.

COMPARATIVE AVERAGE YIELDS OF ALFALFA HAY FROM THREE STRAINS—1913-1915—COTTONWOOD.

Name of Variety	No. of Strains		Average yield of hay in given year—pounds per acre			
	S. D.	S. P. I.	1913	1914	1915	Average
Turkestan.....	240	991	975	1250	5440	2555
Vale	22		1050	1275	4770	2365
Grimm.....	162	29988	1000	1200	4580	2260

It is evident from the above table that the three strains, under the conditions of the trial, rank according

to yield of hay at Cottonwood in the following order: Turkestan, S. D. 240, S. P. I. 991; Vale, S. D. 22; Grimm, S. D. 162, S. P. I. No. 29988.

STRAINS OF ALFALFA FOR HAY PRODUCTION IN STATES OTHER THAN SOUTH DAKOTA.

The strains of alfalfa employed for hay production in South Dakota need not directly affect the strains that may be selected for hay production in other states. Practically, however, the other states, especially those of the middle west and east, buy seed from South Dakota alfalfa growers.

It is apparently desirable for South Dakota alfalfa growers thus to find a market for seed.

It is therefore of much interest to growers in South Dakota to know not only what strains of alfalfa serve our own growers best for hay production, but also whether the same strains, may or may not also be the best hay producers in other states.

Accordingly, the Agronomy Department of South Dakota made a separate inquiry by letter to every Agronomy Department in all the states, requesting to know which of the numbered strains tested in South Dakota had been tested elsewhere for yield. Thirty-eight replies were received from separate State Experiment Stations.

It was not the purpose to make direct quotations from these replies. A number of those from southern states indicated that the chief problem with alfalfa in those states is not one of discovering resistant varieties, but rather one of finding suitable soil conditions. A number of replies from southern and eastern states emphasized that Turkestan strains, had not as yet produced

as high yields of hay as some others. In some instances Common Alfalfa such as that from Kansas and Montana and South Dakota was higher in hay production than any other. Usually Grimm was mentioned favorably as a hay producer, when mentioned at all. One State Experiment Station, not far east, is recommending Grimm entirely to the exclusion of other strains.

These replies from the several Agronomy Departments are much appreciated. They furnish information to the effect that such strains of alfalfa as Common, S. D. No. 12, Vale, S. D. No. 22 and Grimm, which are among our heaviest hay producers, may also yield seed that will be in demand in other states. This is not the case with the strains of Turkestan. Turkestan seed is not usually in demand outside, though this bulletin indicates that it is a suitable variety for hay in our own state.

"An article with a history is a source of unfailing pleasure and interest, providing you know the history." —Alvin H. Sanders.

HISTORICAL.

SOME VARIETIES AND STRAINS OF ALFALFA THAT HAVE BEEN INTRODUCED AND TESTED IN SOUTH DAKOTA.

Alfalfa is any plant of the genus Medicago used, or likely to be used, as a forage crop. Such a definition whether universally accepted or not will indicate the general range of plants included under the name of "alfalfa" within this bulletin.

Such a group of plants includes a large number in South Dakota and moreover the entire group comprises plants which although well understood in a general way are not yet clearly classified.

It is the purpose of this bulletin to add somewhat, if possible, to the knowledge of these several strains of alfalfa. It is believed by the writers that each of these strains should be registered by number, or if not by number, then by name according to some device which will keep them historically distinct from other strains. Such exactness in keeping track of any strain does not in itself add anything to the value of the given strain, but the exactness is necessary just the same, if any extended study is to be made of the strain, especially in comparison with other similar strains.

It will be noted that strains of alfalfa herein recorded have a South Dakota number. This number is nothing more nor less than a serial number given to the strain when it is introduced into trials made by the agronomy department. The number is put down in a record book along with whatever description and history of a newly introduced strain is available.

A large number of strains of alfalfa have been introduced into the United States from foreign countries by the Office of Seed and Plant Introduction of the United States Department of Agriculture. When these plants are so introduced, they are also recorded under a serial

number and this number in turn is nothing more nor less than the one which happens to be given to the strain for recording purposes. It is evident that such plants as have been secured by the agronomy department for test in South Dakota from the Office of Seed and Plant Introduction of the United States Department of Agriculture will possess not only a South Dakota number but also a Serial Plant Introduction number, and this latter number is in fact a part of the history of the strain.

It is worth while for all alfalfa growers to keep in mind the botanical name of alfalfa. The genus name is Medicago, which is easy to remember because the term is derived from Media. From that country, it was brought to Greece.

All alfalfa commonly grown in South Dakota belongs to this genus Medicago, but within the genus are several different kinds or species. These different species differ from one another, some more, some less, but when they are seen growing side by side in nursery rows of the several fields of the South Dakota Experiment Station, or elsewhere, it is not difficult for anyone to see the most prominent differences. They differ in manner of growth, some are upright, some are procumbent, with all manner of degrees between. They differ in color of flowers, some are pure purple, some pure yellow, some white, but others have mixed blossoms of varying hues and shades. They differ in shape of leaves and in number of leaves.

The fact that there are so many differences between the different strains of alfalfa makes them confusing to write about—in fact confusing to study or to buy and sell, or to keep track of on the farm.

The time will soon come when it will be just as necessary to specify varieties of alfalfa for growing in the various districts of the state, as it now is to specify va-

rieties of corn. In fact that time has already come. Growers do not now usually speak of alfalfa without designating whether they refer to Grimm, Turkestan, Common, etc. But more than that, already there are many strains of Grimm—many strains of Turkestan—many strains of Common and many strains of other varieties. Very likely these strains are not all equal, or if they are such equality still remains to be proved.

Definite knowledge then of the histories of strains, whether that history be much or little, long or short, is necessary. The more thoroughly such knowledge is available to all growers or prospective growers of alfalfa the more intelligently will it be possible for them to proceed. It is practical from the standpoint of every alfalfa grower, to make a record of strains by number and description in this bulletin.

It is not especially difficult to classify various kinds of alfalfa from a theoretical standpoint, but it should be understood by alfalfa growers that many of the so-called strains in commerce are not pure. They have been mixed as a result of cross pollination in the field or nursery row. Alfalfa is a little more likely to be mixed even than corn. Even experiment stations and scientific growers are obliged, as a matter of fact, to deal practically with mixed strains, when they would be glad to secure pure strains and keep them so if that were possible under anything like field conditions. As an illustration of this difficulty, ordinary alfalfa usually has purple flowers and the so-called sickle alfalfa usually has yellow flowers, when pure, but the existant strains of ordinary alfalfa frequently are found to produce variegated blossoms and those of sickle alfalfa almost invariably show some mixture in the color of their petals. An attempt to classify all strains of alfalfa at once agriculturally and botanically in the same outline would be practically impossible. The number of strains is not only large but also will be ever increasing and many of the new ones

are bound not to conform to any rigid system of classification, because strains will not remain pure.

The following list of strains is put down, therefore, according to the botanical species to which they theoretically belong. Under these botanical names are placed, by number the strains, introduced into South Dakota with such agricultural history as is in possession of the agronomy department. These latter are also grouped.

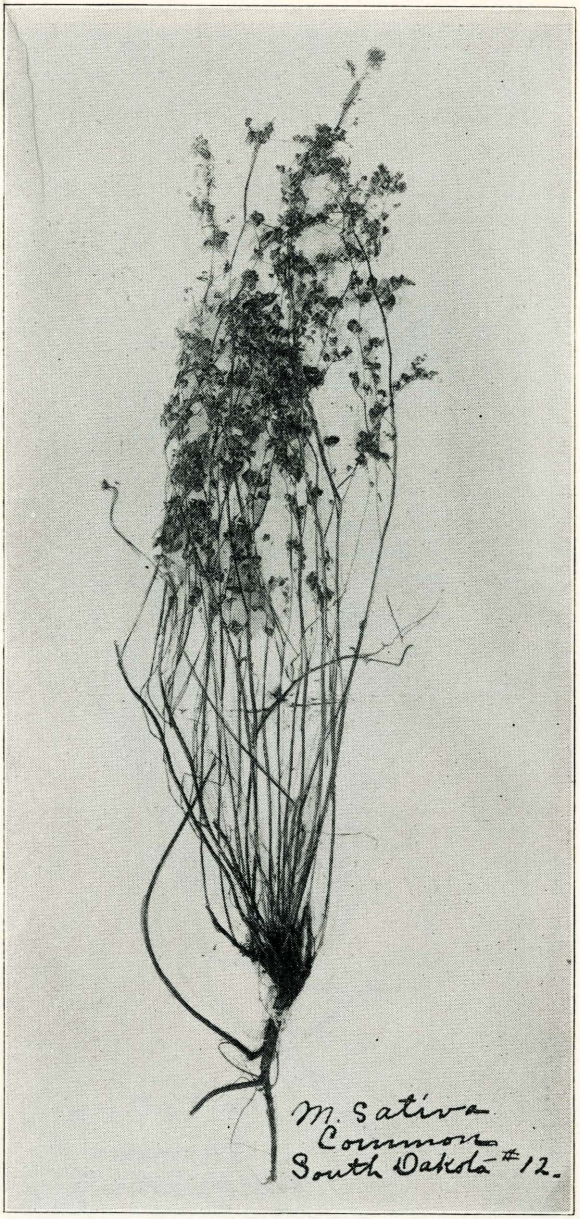
NUMBERED STRAINS OF ALFALFA.

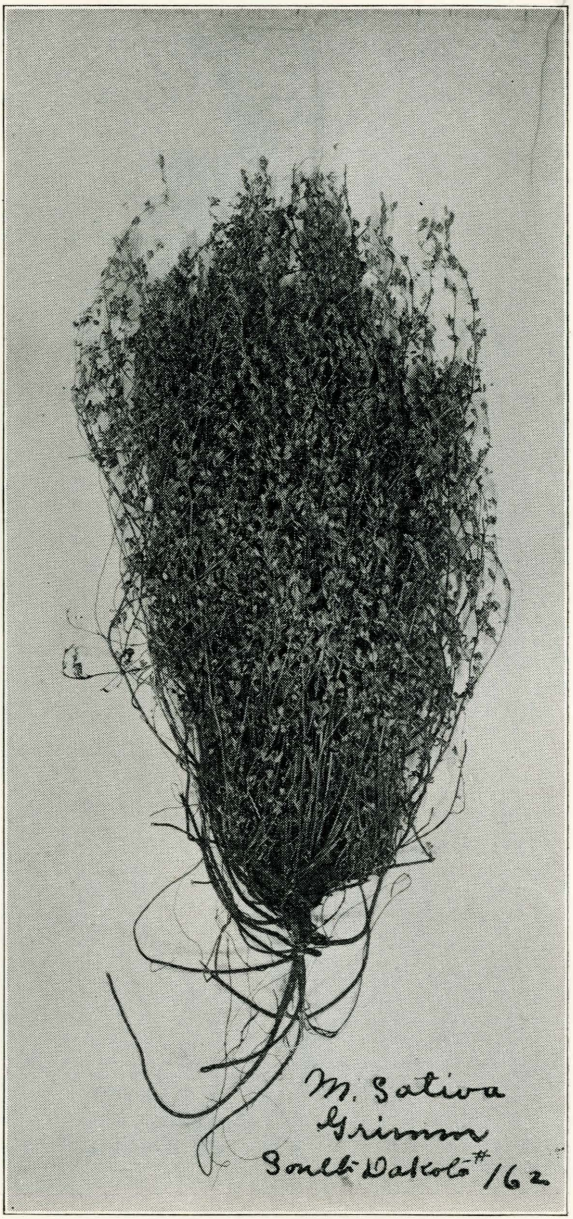
Medicago sativa. This species includes, as commonly put down all the blue, or purple flowered alfalfas. Exceptions, e. g. Grimm with mainly purple flowers but many variations may prove the rule. They are upright in growth, perennial. Leaflets are obovate—oblong, toothed. The flowers are racemed, i. e. borne on an axis, pods twisted spirally.

TURKESTAN:

South Dakota No. 2. S. P. I. No. 11211. Turkestan alfalfa, that is introduced from that country. Seed received from Bureau of Plant Industry, United States Department of Agriculture and by that Bureau from Henry Nungresser & Company of New York. (B. P. I. Bulletin No. 97.)

South Dakota No. 36. S. P. I. No. 20711. (See S. D. Bulletin 120, page 679 and S. D. Bulletin 141, p. 148.) Seed originally from Tashkend, the capitol of Russian Turkestan. Professor Williams of Moscow, Agricultural College has found the strain hardy and very productive. The strain was propagated from one original plant selected by Professor Williams.


M. Sativa
Common
South Dakota 12.


M. Sativa
Grimm
South Dakota #162


M. sativa
Turkestan
South Dakota # 240.

South Dakota No. 914 S. P. I. No. 27214. "Commercial Turkestan, grown from S. P. I. No. 18, 751. Source of parent seed, Turkestan (imported 1906). Grown during season, 1909 at ..... Dickinson, North Dakota. (Brand)" B. P. I. Bulletin No. 207. "At the Moscow Agricultural College, Professor Williams found the strain hardy, while French Lucerne, i. e. the ordinary South European or North African form of the species winter-killed at Moscow." (Hansen) B. P. I. Bulletin No. 132.

South Dakota No. 171. S. P. I. No. 20988. Turkestan received from Bureau of Plant Industry and by that Bureau through Henry Nungresser & Company of New York, May 13, 1907.

South Dakota No. 183. S. P. I. No. 23203. Medicago sativa L. "From Turkestan. Purchased from Mr. H. W. Duerrschmidt, Tashkend, Turkestan. Received June 24, 1908." Turkestan. "Werny or Tschilik alfalfa, from the most northern alfalfa-producing part of Turkestan." (Duerrschmidt) B. P. I. Bulletin No. 142.

South Dakota No. 203. S. P. I. No. 13436. Bureau of Plant Industry Bulletin No. 97 says of this: "Received from Steele, Briggs Seed Co., Toronto, Canada, December 8, 1904." "Seed was obtained from the United States Department of Agriculture,———as Turkestan alfalfa. This variety was not perfectly hardy as tested in plots at Highmore. Further trial, however, is necessary with this number." Wheeler, S. D. Bulletin No. 101, page 139.

South Dakota No. 240. S. P. I. No. 991. "From Tashkend. Received through Professor N. E. Hansen, June 4, 1898 Variety Turkestanica. This

subspecies of alfalfa was obtained from eight different sources varying widely in climatic conditions. (400 bushels.) (See S. P. I. No. 469.)''

''469—From Turkestan Agricultural Society, Turkestan. Received through Professor N. E. Hansen, March, 1898. (See S. P. I. No. 999.)''

''999—From Uralsk Agricultural School Received from Professor N. E. Hansen, from Samarkand, May 24, 1898. (1 package).'' Inventory No. 1—Section of Seed and Plant Introduction, U. S. Dept. of Agri.

South Dakota No. 909. S. P. I. 31333. ''Medicago sativa.'' ''From Tcharjui, Russian Turkestan Presented by Mr. V. A. Paletsky at the request of Mr. Frank N. Meyer, agricultural explorer. Received through Alexander Heingartner, American Consul, Batum, Russia, June 21-22, 1911.'' B. P. I. Bulletin No. 242.

South Dakota No. 913. S. P. I. No. 25192. ''Medicago sativa. From Tulare, California. Grown by Mr. J. T. Bearse, of the Agricultural Substation. Presented by Director E. J. Wickson through Mr. J. M. Westgate. Received April 1, 1909. This was grown from B. P. I. No. 1151, which was secured in Kopal, Siberia. It is considered to be the best variety of Turkestan alfalfa tested by the California Experiment Station. It has variegated flowers as do commercial sand lucerne, Grimm alfalfa and several other strains. (Westgate)'' B. P. I. Bulletin No. 168.

South Dakota No. 768. S. P. I. No. 22788. ''Medicago sativa. From Tashkend, Turkestan. Purchased from Mr. H. W. Duerrschmidt. Received May 4, 1908.'' B. P. I. Bulletin No. 142.

South Dakota No. 926. S. P. I. No. 31811. "Medicago sativa L. From Khotan, Chinese Turkestan. (No. 1504a. November 24, 1910). A variety of alfalfa called Chilga beda meaning fibery lucerne. This variety seems to need less irrigation than the following. A tall grower, stems erect, slightly woody, leaves rather small. (Meyer)" B. P. I. Bulletin No. 248.

"S. P. I. No. 31812. From Khotan, Chinese Turkestan (No. 1505a. November 24, 1910). A variety of alfalfa called Kara beda meaning black lucern. Leaves large dark green, stems succulent, not very high growing. Not as good for hay as the preceding numbers, however it supplies green fodder until frost, while the Chilga variety stops growing at the end of summer. It is not able to stand as severe cold as the Chilga. (Meyer)" B. P. I. Bulletin No. 248.

South Dakota No. 905. S. P. I. No. 31813. "Medicago sativa L. From Kashgar, Chinese Turkestan. (No. 1506a. January 14, 1911). An alfalfa called Kara beda. In Kashgar this is considered the better of two varieties. It is apparently the same as the Chilga beda from Khotan. (Meyer)" B. P. I. Bulletin No. 248.

South Dakota No. 949. S. P. I. No. 25606. "'Grown from S. D. No. 164. In all the tests made at Brookings and Highmore, South Dakota, this has appeared to be almost if not quite perfectly hardy. The best of all the Turkestan alfalfas tested under South Dakota conditions.' (Westgate.) From Mitchell, South Dakota. Presented by W. A. Wheeler. Received June 7, 1909." B. P. I. Bulletin No. 168.

South Dakota No. 950. S. P. I. No. 22790. "Medicago sativa L. From Tashkend, Turkestan. Purchased from Mr. H. W. Duerrschmidt. Re-

ceived May 4, 1908. From Khiva, hot summer, mild winter." B. P. I. Bulletin No. 142.

GRIMM:

The blossoms of Grimm alfalfa vary in color from white to purple—some being gray, moreover the petals of the flowers of Grimm alfalfa are somewhat larger in size than those of most of the other commonly grown alfalfas. Grimm alfalfa not only has blossoms varying in color but foliage of different plants varies noticeably, many plants having narrow leaflets. These variations give rise to some question as to whether Grimm alfalfa should be classified within any pure botanical species. Nevertheless, its characteristics, though variable usually serve to identify it from other kinds. It is also put down here, as usual, as one of the varieties Medicago sativa.

South Dakota No. 162. S. P. I. No. 29988. This strain of Grimm was tested on plot No. 372 at Brookings in 1909, 1910, 1911. (See Bulletin No. 133—page 261); also at Highmore on plot No. 147 in 1908, 1909, 1910 and 1911. (Bulletin 133—page 266). See also S. D. Bulletin No. 101—page 136 which contains the following: "The seed of this number is according to records from the same original source as No. 67 but in all tests made during the last two years, the results obtained from these two numbers are at variance. No. 162 is very much hardier than No. 67; in fact, it seems to be perfectly hardy as not a plant was known to winter kill in 1905-1906 either in selection rows or in plots under varying conditions at Highmore." (Wheeler).

South Dakota No. 170. S. P. I. No. 21827. "Medicago sativa. Grimm. From Chinook, Montana. Purchased from Mr. F. G. Cooper. Received January 22, 1908. (Hansen)". B. P. I. Bulletin No. 137.

South Dakota No. 180. S. P. I. No. 21735. "Medicago sativa L. From Alma, Nebraska. Purchased from Mr. Conrad Boehler. Received January 6, 1908. Grimm. Grown from S. P. I. No. 12991. Grown especially for the Department, under direction of Forage Crop Investigations, by Mr. Conrad Boehler." B. P. I. Bulletin No. 137.

South Dakota No. 763. S. P. I. No. 25244. "Medicago sativa. From Alma, Nebraska. Grown in summer of 1908 by Mr. Conrad Boehler. Received through Mr. J. M. Westgate, April 7, 1909. Grimm. A field of ordinary alfalfa was in bloom alongside of the field from whence the seed was obtained and some cross-pollination may have taken place. (Westgate). B. P. I. Bulletin No. 168.

South Dakota No. 896.--S. P. I. No. 29986. "Medicago sativa L. From Excelsior, Minnesota. Purchased from Mr. A. B. Lyman. Received February 25, 1911. Montana grown Grimm." D. Fairchild.

South Dakota No. 915. S. P. I. No. 26117. "From Indian Head, Saskatchewan, Canada. Dominion Experiment Farm for Saskatchewan. Grimm grown at Indian Head from S. P. I. No. 12991. Seeded in comparison with eight other strains in spring of 1905. No. 12991 was produced in Minnesota in 1904 and was secured from Mr. A. B. Lyman, Excelsior, Minnesota. In the Indian Head experiments it has proven from the first (1905 to 1909) to be the best of the nine strains under test. (Brand)."

BALTIC:

South Dakota No. 167. (Following from S. D. Bulletin No. 101, page 138): "The original source from which the seed of this number was introduced into this country is unknown. Mr. W.

F. Kelly of Renner, South Dakota, purchased the seed about ten years ago from a seed dealer at Hartford, South Dakota. He and Mr. E. C. Evans of the same place have grown it for about ten years and consider it better than other alfalfas tried in their vicinity. Mr. Kelly furnished several pounds of seed to the Agricultural College in 1905. A two years' trial of the variety is rather short upon which to draw conclusions. In all our tests, however, both at Highmore and Brookings, this number has shown itself equal to any in quality, hardiness and seed production. It has not been sown in the selection rows and so has not been put to quite so severe a test for hardiness as No. 162 (Grimm) and as there is no record of its having been tested under northern conditions in the past as has No. 162, it cannot be compared in hardiness to the latter number. In seed production it is equal if not superior to No. 162. In quality and the vigor of early spring growth it appears to be equal to any.'' Wheeler.

South Dakota No. 891.--S. P. I. No. 25537. ''Medicago sativa L. From Mitchell, South Dakota. Presented by W. A. Wheeler. Received May 29, 1909. Grown from S. D. No. 167. This strain which was originally secured near Baltic, South Dakota, has proved extremely hardy and drought resistant, it possessed the same variegated flowers that are to be observed in the Grimm alfalfa and the commercial Sand Lucern. (J. M. Westgate)'' B. P. I. Bulletin No. 168.

COMMON:

The name ''Common'' virtually signifies little so far as the history of any strain of alfalfa is concerned except to signify that it is not some other

strain with a definitely known history. For instance, if one speaks of common alfalfa one certainly does not mean any known strain of Turkestan nor of Grimm nor any known strain of any variety.

These several strains which may be called "Common" have been introduced into the United States for a long time, but have neither become pedigreed strains nor acquired any other notable recorded history. The various kinds bearing this name "Common" apparently came into the United States from alfalfa that was introduced into California from Chili (1854), also from that introduced from Mexico to Texas early in the 19th century, and from that introduced into New York from Europe in 1791. Alfalfa introduced into California in 1854 has since largely been produced on irrigated areas. Thus the term "irrigated" arises in connection with the description of some of these strains. For this reason such are popularly classified not only as "Common" but also as "irrigated". Other common alfalfas have not been produced under such conditions, but rather the opposite, and are designated as "Dry-land" alfalfas. Such varying sources of introduction without much doubt gives rise to wide differences which are found among different kinds of common alfalfa coming now from different places or from the same community.

Given lots of seed sold under the name "Common" are usually commercial strains which have never been submitted to anything by way of plant breeding except natural selection. As would be expected, "Common" alfalfa varies in regard to botanical characteristics. The flowers are theoretically bluish-purple, leaves variable in shape, as for instance, some narrow, some almost broadly

oval with gradations between. Common alfalfas are usually upright in growth. The following strains of common alfalfa may also be called irrigated strains for the reason that they have been produced on irrigated land. Botanically they are like others.

COMMON—IRRIGATED:

South Dakota No. 753. S. P. I. No. 22558. "Medicago sativa irrigated. From Gunnison, Utah. Purchased from Mr. W. H. Gribble through Mr. C. J. Brand. Received April 8, 1908." B. P. I. Bulletin No. 142.

South Dakota No. 764.--S. P. I. No. 22558. Irrigated. "Grown at Centerfield, Utah, in the San Pitch Valley. This seed is grown from the first crop of the season. (Brand.)" B. P. I. Bulletin No. 142.

South Dakota No. 924. S. P. I. No. 27237. "Utah Irrigated. Grown from S. P. I. No. 12784. Source of parent seed. Emery, Utah (crop, 1904)." B. P. I. Bulletin No. 207. "No. 12784 Medicago sativa, from Ogden, Utah. Received through C. A. Smurthwaite Produce Co. This seed was raised in Emery County, Utah, on land that is irrigated. The land has been cropt for forage for fifteen years and in 1904 it was cropt for seed for the first time. The seed was taken from second growth." B. P. I. Bulletin No. 97.

COMMON—NON-IRRIGATED:

It is a common belief among alfalfa growers that "non-irrigated" or "dry-land" seed will produce plants that can grow with comparatively little moisture. Such a belief correct or incorrect emphasizes the denomination here given. The following common alfalfas might also be called "non-

irrigated'' alfalfas merely to distinguish them from similar strains produced under the various irrigation ditches.

South Dakota No. 1 S. P. I. No. 12409. "Utah" "From Ogden, Utah. Received through the Smurthwaite Produce Co., December 30, 1904. This seed was grown on the ranch of E. M. Brimall, Diamond Ford, Spanish Fork Canyon, Utah County, Utah, on land without irrigation above water line in Section 1, Township 9, south range 4 east. This land has grown alfalfa seed for 19 years in succession and this seed is from the 19th crop." B. P. I. Bulletin No. 97.

South Dakota No. 6.__S. P. I. No. 12747. "Montana." "From Billings, Montana. Received through Mr. I. D. O'Donnell. January 19, 1905." B. P. I. Bulletin No. 97.

South Dakota No. 7.__S. P. I. No. 12801. "Texas" "From Mulock, Texas. Received through Mr. J. M. Simmons. February 1, 1905." B. P. I. Bulletin No. 97.

South Dakota No. 9. S. P. I. No. 12820. "Medicago sativa, from Clearwater, Nebraska. Received through Mr. G. E. Miller, February 7, 1905." B. P. I. Bulletin No. 97.

South Dakota No. 10. S. P. I. No. 13291. "New York." "From Fayetteville, New York. Received through Mr. F. E. Dawley, April 1, 1905." B. P. I. Bulletin No. 97.

South Dakota No. 12.
Alfalfa has been produced in South Dakota, for years by a large number of growers. Some of these growers secured seed from farmers within the state, who in turn had secured seed from for-

gotten, or indefinite, sources. It is possible that these various early growers were using seed from stocks that originally all came from a single source. Perhaps that cannot now be proved. Certain it is that, whether from a single source or several, this alfalfa, long grown in South Dakota, has a type that is recognized among growers.

The writers understood that one of the earliest alfalfa growers in South Dakota was Mr. Seth Bullock, of Deadwood. Inquiry was accordingly made of him by letter. Mr. Bullock returned the following correspondence which had previously passed between himself and Mr. Chas. C. Haas. It would seem from that that the original source of a good deal of the seed-stock known as South Dakota No. 12 may have been the Utah seed, first purchased by Mr. Bullock. The following are extracted from the letter and the reply thereto:

"The First Alfalfa Field Planted in South Dakota."

"The following self-explanatory correspondence between Chas. C. Haas of the Glenheim Farm, Whitewood Valley and Capt. Seth Bullock deals with an interesting subject and relates to an interesting historical fact."

"Mr. Haas to Capt. Bullock."

"Dear Sir:

"I am especially desirous of proving that the Black Hills was the pioneer of the central northwest in the growing of alfalfa as it would be of great value in the marketing of our seed, buyers much preferring to buy seed from old fields; fields that have been exclusively in alfalfa for a number of years. . .

"I have been looking up the history of our fields here, most of the old timers believe that you

were the first to plant alfalfa in the Hills country. A number of our growers say they got their seed from your farm in the early '80s. Sam Martin sowed his first field in '85 and Thompson a year or so earlier. Bill Quigley says he visited your place the winter of '84 and saw your men feeding alfalfa hay. Abe Jones says his brother Tom, got seed from you in '82 or '83 to sow on his Big Bottom ranch.

"We will be greatly obliged if you can aid us in establishing the date of the first sowing of alfalfa seed in this part of the northwest.

"Did you make a shipment of seed to eastern Montana in '82?

"An early reply will greatly oblige,

"Yours truly,

"Chas. C. Haas."

"Captain Bullock's Reply"

"Dear Sir: Replying to your letter of inquiry in regard to the introduction of alfalfa in South Dakota, I beg to state that on my ranch at the mouth of Redwater in Butte County, South Dakota, I had planted in 1881 the first alfalfa seed brought to the state or "territory of Dakota" as it was known at that time. I had observed the plant growing in Bear River Valley, Utah, where it was known as Lucern. I purchased the seed in Salt Lake City through Captain Thomas Russell of Deadwood, the agent of the Union Pacific R. R., and Wells Fargo Express Co. It came to Cheyenne on the Union Pacific and from there on the stage coach; it was planted in June and a seed crop raisthat year, some of which was kept on the ranch, and the rest disposed of by giving to any of the few settlers in the valleys who wished to test the plant on their places; it was some of this seed that Tom Jones, of Big Bottom, got. In 1882 we

had three cuttings, in 1883 we also got three cuttings, the first being light on account of the big flood in May of that year, an event remembered by all who were in the Hills at that time.

The following year 1884 we again let the crop go to seed, and had it threshed by Andy Snyder, a well known farmer of the Belle Fourche Valley. We retained enough of the seed to put in thirty additional acres, giving the rest to anyone who wanted to get a start in alfalfa. This seed I am sure is the parent seed of the hardy alfalfa grown in the Whitewood and Belle Fourche Valleys at this date, as the Jones Brothers of Whitewood Valley, Snyder Brothers of Belle Fourche Valley and others whose names I do not recall, got some of the seed; many of them have kept their fields intact since 1884 and '85, and neither freezing nor drought seems to affect this strain of alfalfa. Anyone interested can see today on the Bullock ranch at Belle Fourche a field that has produced not less than three cuttings a year since it was sown over thirty years ago.

These statements can be verified by any of the old time settlers in the Belle Fourche Valley. Mr. Fred Fuller now a resident of Belle Fourche, assisted in putting up alfalfa on the Bullock ranch in 1883, and resided on the ranch for a number of years afterwards as ranch manager.

In regard to the shipment of alfalfa seed to Montana mentioned in your letter, I may have sent some to the store in Billings in 1883 or '84.

Yours truly,

Seth Bullock."

South Dakota No. 22. "Vale."

This strain of seed is commonly named "Vale", in South Dakota, because the stock now propagated was secured from land near the town of that

name in the northern edge of the Black Hills. "Vale" is here given a separate number, because although in the same general class as South Dakota No. 12, it has received several years of special propagation. The strain was secured by Dr. H. H. Stoner of Highmore, South Dakota, and has been increased by himself and others for several years.

South Dakota No. 23. S. P. I. No. 12816. "Northern Montana." "From Chinook, Montana. Received through the Thomas O'Hanlon Company, February 6, 1905. Grown by Mr. F. T. Reser, one mile west of Chinook." B. P. I. Bulletin No. 97.

South Dakota No. 173. S. P. I. No. 19508. "Kansas." "Medicago sativa; from Bridgeport, Kansas. Received through Mr. Carl Wheeler, December 10, 1906, 2000 pounds of seed grown from a fifteen-year old alfalfa field. In 1901 this field produced 8 bushels of seed per acre. Rainfall 25 inches not irrigated. 30 feet to water." (J. M. Westgate). Note furnished by R. A. Oakley.

South Dakota No. 229.--S. P. I. No. 22559. Medicago sativa. "From Gunnison, Utah. Purchased Mr. W. H. Gribble, through Mr. C. J. Brand. Received April 8, 1908. Dry-land. 'Grown in the Sevier Valley, near Gunnison, Utah in 1907.' (Brand.)" B. P. I. Bulletin No. 142.

South Dakota No. 181. S. P. I. No. 23454 "Montana."

South Dakota No. 652. S. P. I. No. 29339. Medicago sativa L. "From New York, N. Y. Purchased from Messrs. Henry Nungresser & Com-

pany. Received January 9, 1911." David Fairchild.

South Dakota No. 747. S. P. I. No. 21945. "Medicago sativa. From Sextorp, Nebraska. Purchased from Mr. Lewis Brott. Received February 15, 1908. Dry-land. This seed was grown on the high plains of western Nebraska for about twelve years. Crop of 1907." (Brand.) B. P. I. Bulletin No. 137.

South Dakota No. 892. S. P. I. No. 18629. "Medicago sativa. From Buffalo, New York. Received through the Harvey Seed Co., June 13, 1906. Canadian grown alfalfa." B. P. I. Bulletin No. 106.

South Dakota No. 902. S. P. I. No. 22559. "Dry-land. Grown in Sevier Valley, near Gunnison, Utah, 1907." (Brand.) B. P. I. Bulletin No. 142.

South Dakota No. 906. S. P. I. No. 32279. Medicago sativa L. "From Blue Rapids, Kansas. Purchased from Mr. F. Newson. Received December 13, 1911." David Fairchild.

South Dakota No. 910. S. P. I. No. 21022. Medicago sativa. "From Sextorp, Nebraska. Received through Mr. Lewis Brott, May 31, 1907." David Fairchild.

South Dakota No. 916. S. P. I. No. 29353. Medicago sativa L. "From Yuma, Arizona. Purchased from Mr. Wm. B. Lloyd. Received January 13, 1911." David Fairchild.

South Dakota No. 921. S. P. I. No. 27234. "Utah, dry land. Grown from P. L. H. No. 3255.

Source of parent seed, Nephi, Utah (crop of 1907). Nine plants yielded one-half pound of seed. Average per plant twenty-five grams; five hundred eighty-two seeds per gram." B. P. I. Bulletin No. 207.

South Dakota No. 925. S. P. I. No. 26860. Medicago sativa L. "From Pullman, Washington. Grown in experimental plots by Mr. M. W. Evans. Received fall of 1909." D. Fairchild.

IMPORTED STRAINS OF MEDICAGO SATIVA INTRODUCED IN RECENT YEARS, FROM COUNTRIES OTHER THAN TURKESTAN.

Inasmuch as these strains were imported into the United States from given countries, they might naturally be named after those countries, in the same way that Turkestan strains are named after the country from whence they were brought into the United States. They are "geographic strains." It so happens that none of the following have become so well known in this way, however, as the strains of Turkestan.

South Dakota No. 5.--S. P. I. No. 12695. "French" "Medicago sativa. Received through Vilmorin-Andrieux & Co. from Paris. Grown in Poitou." B. P. I. Bulletin No. 97.

South Dakota No. 11. S. P. I. No. 13858. "Russian." "Medicago sativa. Received through Vilmorin-Andrieux & Co. May 8, 1905. From Kharkov, Russia." B. P. I. Bulletin No. 97.

South Dakota No. 13. S. P. I. No. 13857. "Russian." "Medicago sativa. Received through Vilmorin-Andrieux & Co., May 8, 1905. From Simbirsk, Russia." B. P. I. Bulletin No. 97.

South Dakota No. 176. S. P. I. No. 25022. "German" "Medicago sativa. From Oberschupf, Baden, Germany. Secured from Mr. Ludwig Keller, Oberschupf amt Boxberg, Baden, Germany, at the request of Mr. Chas. J. Brand. Received March 11, 1909. Alt-Duetsche Frankische Lucern." B. P. I. Bulletin No. 162.

South Dakota No. 179. S. P. I. No. 23481. "German" "Medicago sativa varia. From Hamburg, Germany. Purchased from R. Liefman Sons, Successors, through Mr. I. L. Radwaner, 533 East 149th street, New York. Received August 31, 1908. Sand lucern." B. P. I. Bulletin No. 148.

South Dakota No. 202. S. P. I. No. 12992. "Arabian" "Medicago sativa. From Bassorah, Arabia. Secured through H. P. Chalk, Esq., American Counselor Agent. Received February 27, 1905." B. P. I. Bulletin No. 97.

"From preliminary tests of this alfalfa, made from a previous importation, under S. P. I. No. 8806, it seems probable that this particular strain will make a more rapid growth than the ordinary varieties cultivated in this country and may prove especially valuable for certain regions in southern California and Arizona. These preliminary experiments have been carried on at the Pomona Substation in California, where this variety, together with the ordinary and the Turkestan varieties, planted side by side at the same time, exhibited most unusual rapidity of growth." (Fairchild) B. P. I. Bulletin No. 97.

South Dakota No. 204. S. P. I. No. 12847. "Tripoli" "Medicago sativa. From Gabes." B. P. I. Bulletin No. 97.

South Dakota No. 653. S. P. I. No. 35085. "Russian" "Medicago sativa L. From Novospaska, Syzran-Riazan R. R., Russia. Purchased from Mr. A. Weikoff by Mr. Frank N. Meyer of this Bureau. Received March 26, 1913." David Fairchild.

South Dakota No. 654. S. P. I. No. 35086. "Russian" "Medicago sativa L. From Novospaska, Syzran-Riazan R. R., Russia. Purchased from Mr. A. Weikoff by Mr. Frank N. Meyer of this Bureau. Received March 26, 1913." David Fairchild.

South Dakota No. 458. S. P. I. No. 27212. "Canadian" "Grown from S. P. I. No. 21247. Source of parent seed, Canada (Imported in 1907). Twenty-six plants yielded three-fourths pounds of seed. Average per plant twelve and nine-tenths grams; 545 seeds per gram." B. P. I. Bulletin No. 207.

South Dakota No. 643. S. P. I. No. 31892. "Chinese" "Peking, China. Presented by Mr. B. Laufer. Received September 28, 1911." B. P. I. Bulletin No. 248.

South Dakota No. 644. S. P. I. No. 27369. "Spanish" "Grown at Dickinson, North Dakota, from cuttings obtained at Lanham, Maryland. Original seed from the Botanical Gardens, Madrid, Spain." B. P. I. Bulletin No. 207.

South Dakota No. 761. S. P. I. No. 31944. "Indian" "From Quetta, Quandhari, India. Presented by Mr. A. Howard, Agricultural Research Institute. Received October 9, 1911." B. P. I. Bulletin No. 261.

South Dakota No. 766. S. P. I. No. 28908. "Chinese" "Medicago sativa. From Ti-tao Kansu Province, Western China. Presented by Mr. B. Laufer, Field Museum Chicago, Illinois, who procured them from Mr. D. P. Ekvall, an American Missionary of Ti-tao. Received October 17, 1910." B. P. I. Bulletin No. 227.

South Dakota No. 770. S. P. I. No. 27204. "Mongolian" "Grown from S. P. I. No. 21232. Source of parent seed Mongolia (Small seed, imported 1907). Grown during the season of 1909 at experimental substation at Dickinson, North Dakota—and transmitted—numbered March, 1910 (Brand)". B. P. I. Bulletin No. 207.

South Dakota No. 897. S. P. I. No. 31939. "Indian" "Medicago sativa L. From Gilghit, Kashmir, India. Received through Mr. F. Booth Tucker, Salvation Army, Simla, India, October 2 and 4, 1911." B. P. I. Bulletin No. 261.

South Dakota No. 903. S. P. I. No. 28037. "Russian" "Medicago sativa. Samara. This Lucern seed has been grown in one of the coldest Governments in Russia, and has been recognized to be the hardiest strain ever offered—Samara Government, near the Ural." (Vollmer) B. P. I. Bulletin No. 208.

South Dakota No. 907. S. P. I. No. 29140. "Indian." "From India. Presented by Mr. F. Booth Tucker, Salvation Army, Simla, India. From the Punjab Agricultural College (In irrigated colonies). The ordinary M. sativa as grown in the Punjab by horse breeders." B. P. I. Bulletin No. 227.

South Dakota No. 922. S. P. I. No. 27224. "Russian." "Grown from S. P. I. No. 13857. Source of parent seed Simbirsk, Russia (Imported 1905). Twelve plants yielded one-half pound

of seed. Average per plant eighteen grams; 502 seeds per gram." B. P. I. Bulletin No. 207.

South Dakota No. 13. S. P. I. No. 13857. "Russian." "Medicago sativa. Received through Vilmorin-Andrieux & Co., May 8, 1905. From Simbirsk, Russia. B. P. I. Bulletin No. 97.

South Dakota No. 927. S. P. I. No. 9359. "Caucasian." "Medicago sativa. From Erivan, Caucasia. Obtained by Mr. E. A. Bessey (No. 236, October 7, 1902) through Mr. N. P. Taratinoff of Tiflis. Received February 3, 1903—from Erivan Province reaching 22° F." B. P. I. Bulletin No. 66.

South Dakota No. 928. S. P. I. No. 31687. "Mongolian." "From Chugutchak, Mongolia. Received through Frank N. Meyer, Agricultural Explorer, August 18, 1911. No. 1617a (May 16, 1910). A strain of alfalfa said to be much hardier than the ordinary varieties, but also said to be of slower growth. While fields sown to imported Turkestan give three cuttings a year in Chugutchak, this variety gives but two, but while one-third of the plants of the Turkestan alfalfa are killed in a severe winter, this strain is said not to suffer at all. This seed was saved by a Sart farmer from his own plants and obtained through the assistance of the Russian Aksakal at Chugutchak. (Meyer)". B. P. I. Bulletin No. 248.

South Dakota No. 930. S. P. I. No. 27222. "German." "Alt-Deutsche Frankische Luzerne. Grown from P. L. H. No. 3321. Source of parent seed Baden, Germany (Imported 1908). Eighteen plants yielded one pound of seed. Average per plant twenty-five grams; 495 seeds per gram." B. P. I. Bulletin No. 207.

South Dakota No. 931. S. P. I. No. 26911.

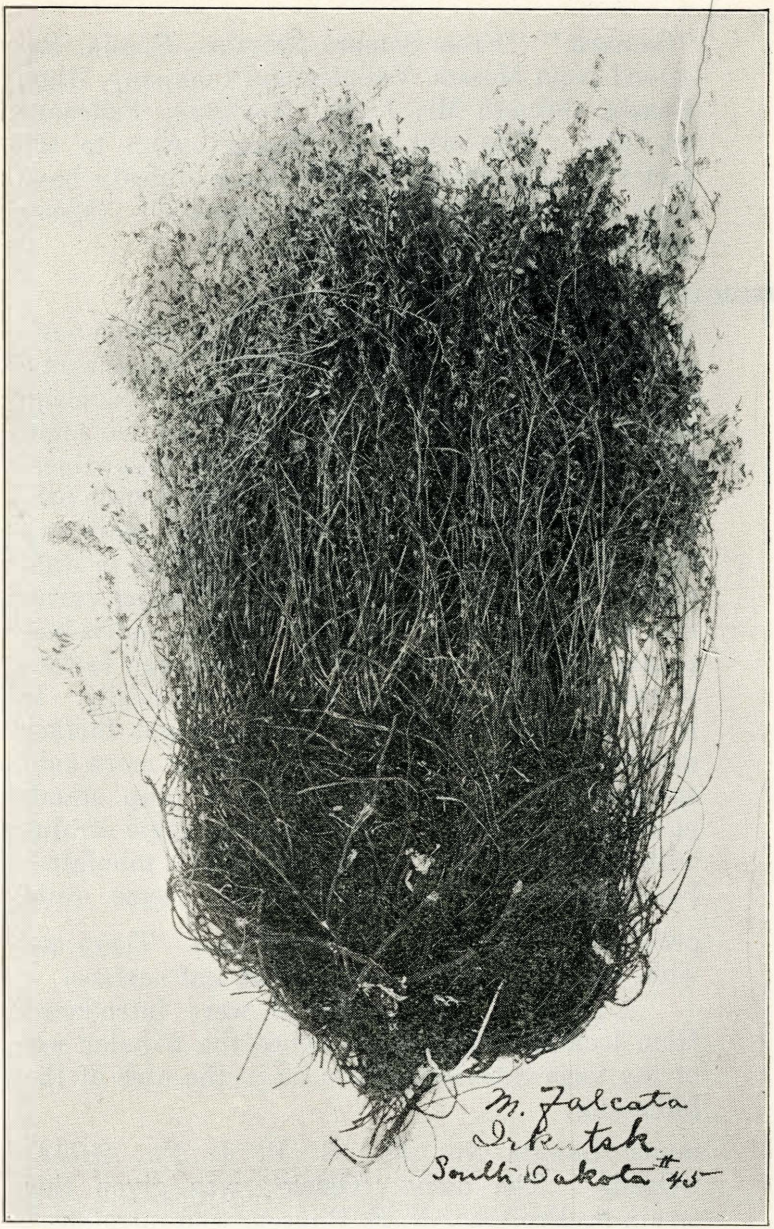
"Samara." "From Samara Province, Russia. Received from Messrs. Vollmer and Company, Riga, Russia, through Mr. J. M. Westgate, February 28, 1910. 'This seed is of interest owing to the fact that introductions of Medicago falcata have been secured from this same section." (Westgate)". B. P. I. Bulletin No. 207.

MEDICAGO FALCATA:

As indicated by the name, this would include various forms of the genus Medicago having sickle shaped pods as contrasted with those of Medicago sativa, which are spirally twisted. In the main the sickle alfalfas have yellow or part yellow blossoms. Sickle alfalfa is not only distinct from other kinds, but the various strains vary markedly from one another. Indeed, classification is difficult and tentative because of this striking variation between strains and even between individual plants within assumed strains. Medicago falcata is considered as a single species botanically. It it even possible that later studies might further divide the species at least into two or more subspecies As now understood from a crop standpoint there are also numerous geographic strains with botanical differences not fully tabulated. Some strains are upright in growth, some quite procumbent, with variations between. There are wide variations also in amount of leaf surface.

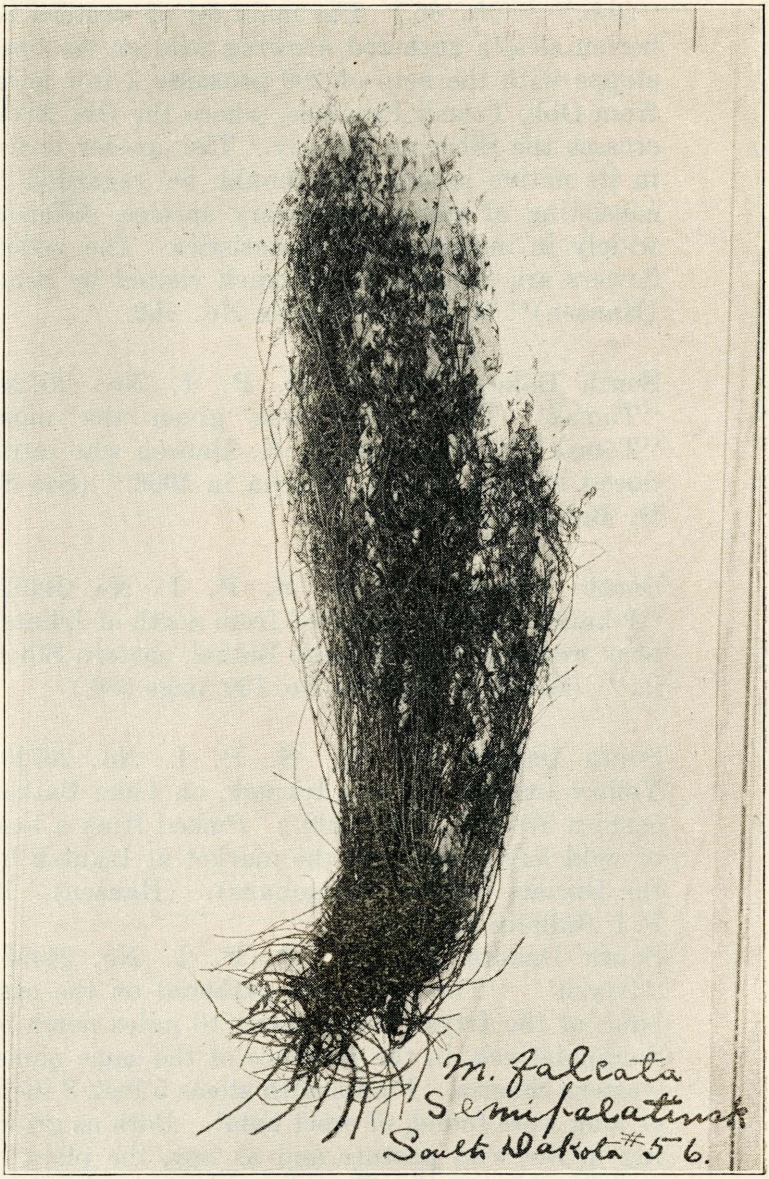
A number of these strains were introduced from localities in Siberia, hence the popular use of the term Siberian alfalfa as in the case of the following:

South Dakota No. 40. S. P. I. No. 20718. "Omsk." The name "Omsk" was given this strain by Professor N. E. Hansen, who introduced it from the town in Siberia of that name in 1906. (See S. D. Bulletin No. 141.)


M. falcata
Irk. tak
South Dakota #45


M. falcata
Sarator
South Dakota # 5-0.


M. falcata
Crewsburg
South Dakota #05-5


M. falcata
Semipalatinsk
South Dakota #5 6.

South Dakota No. 42. S. P. I. No. 24452. "Obb." "(No. 66.) The main lot of western Siberian alfalfa gathered growing wild on the open steppe with the help of 200 peasants a few miles from Obb, Tomsk Province, where the Obi River crosses the Siberian railway. The species varies in its native haunts and should be regarded as consisting of many elementary species, differing widely in important characteristics. The yellow flowers are attractive and much visited by bees. (Hansen)" B. P. I. Bulletin No. 162.

South Dakota No. 43. S. P. I. No. 20724. "Tomsk" This strain was given the name "Tomsk" by Professor N. E. Hansen who introduced it from Tomsk, Siberia in 1906." (See S. D. Bulletin No. 141.)

South Dakota No. 44. S. P. I. No. 24452. "Irkutsk." "Seed gathered from north of Irkutsk near western shore of Lake Baikal, eastern Siberia." (See S. D. Bulletin No. 120, page 680.)

South Dakota No. 45. S. P. I. No. 20720. Yellow Lucern "From Irkutsk, on Lake Baikal, eastern Siberia. (No. 200.) Picked from a load of wild hay brought to the market at Irkutsk by the Buriats (native Mongolians). (Hansen)" B. P. I. Bulletin No. 132.

South Dakota No. 51. S. P. I. No. 24455. "Irtysh" "This seed was gathered on the east bank of the Irtysh River about 10 miles north of Semipalatinsk, in the province of the same name, western Siberia. Plants with stems 5 feet, 8 inches long were found, of erect habit. Both as growing in the wild pasture and as hay, the plant is well liked by stock. The plant is also much visited by bees. (Hansen)" B. P. I. Bulletin No. 162.

South Dakota No. 52. S. P. I. No. 20719. "Omsk" This and also S. P. I. No. 20718 were introduced by Professor N. E. Hansen from Omsk, Siberia, in 1906. (See S. D. Bulletin No. 141, page 142).

South Dakota No. 56. S. P. I. No. 24455. "Semipalatinsk" "The most vigorous form of this species, as far as I have observed is that found in the dry steppes of the Semipalatinsk region (Akmolinsk Province) western Siberia. In 1908, I gathered seed on the Irtysh River about 10 miles north of Semipalatinsk (S. P. I. No. 24455) from plants of erect habit with stems some of which were five feet, eight inches long. Flowers bright yellow. In 1909 some more seed was gathered for me in the Semipalatinsk Region." (S. D. Bulletin No. 141, page 98 by Hansen.)

South Dakota No. 61. S. P. I. No. 24454. "(No. 86) See 66 (S. P. I. No. 24452). This lot is from north of Irkutsk near western shore of Lake Baikal, eastern Siberia and extending to a hundred miles north among the Buriats, a Mongolian tribe. This region is moister in climate than farther east on the open steppe so may be found better adapted for regions like northern Maine, Minnesota, and Wisconsin. (Hansen)". B. P. I. Bulletin No. 162.

South Dakota No. 62. S. P. I. No. 24456.

"Charonte" "No. 58. Although but a small quantity of seed, this number should receive special attention, as it is from the farthest point east where I found this Siberian alfalfa seed gathered in almost pure sand at Station Charonte, in an arm of the Desert Gobi, a few miles from Chinese territory on the Siberian railway. This is in the

Mongolian part of Manchuria, Manchuria proper not beginning until after crossing the Chinese mountains. This region is marked by great extremes of heat and cold and especially by the fact that often cold sufficient to freeze mercury is experienced with no snow on the ground.'' (Hansen) B. P. I. Bulletin No. 162.

South Dakota No. 63. S. P. I. No. 24453. ''Omsk.'' ''(No. 90) As found wild on open steppe at Omsk, Akmolinsk Province, western Siberia. (Hansen)'' B. P. I. Bulletin No. 162.

South Dakota No. 526. S. P. I. No. 34116. ''Collected in the vicinity of Semipalatinsk, Siberia. Purchased from Mr. G. T. Miroshnikov. Received July 11, 1912. 'This seed is of the ordinary ''Sholteek'' and is imported for the special purpose of naturalizing this important wild forage plant in various sections of the Northwest, especially on grazing lands in the Dakotas, Montana, Wyoming, Colorado, and Idaho. It thrives better in sod-grass regions than in bunch-grass sections. See also remarks made under No. 32389.' (Frank N. Meyer)'' Inventory of Seeds and Plants Imported. No. 32.

South Dakota No. 762. S. P. I. No. 32180. ''Medicago falcata. From Barnaul Siberia (No. 1638a. September 1, 1911). A sholteek collected in the Kuznetsk district to the east of Barnaul, said to be of vigorous growth. Presented by Mr. N. B. Sokoloff, agricultural instructor at Barnaul. (Meyer)'' B. P. I. Bulletin No. 261.

Numerous strains of Medicago falcata have been introduced into the United States from other places than Siberia. These are similar in general botanical features

to those called Siberian, but would not strictly be called such. A number of them were brought from European Russia. These are as follows:

South Dakota No. 46. S. P. I. No. 20725. "Don." Named "Don" by N. E. Hansen who introduced the strain from the Don Province of the lower Volga River region South Eastern Russia in 1906. (See S. D. Bulletin No. 141, page 142.)

South Dakota No. 47. S. P. I. No. 20717. "Kharkov." This was introduced by N. E. Hansen from Kharkov Province South Eastern Russia, in 1906. (See S. D. Bulletin No. 141, page 141.)

South Dakota No. 48. S. P. I. No. 20726. "Samara." "From Samara Province, Russia (No. 206.) Another sample of seed from wild plants of this promising forage plant. See No. 201. S. P. I. No. 20721. (Hansen)." B. P. I. Bulletin No. 132.

South Dakota No. 49. S. P. I. No. 20721. "Russian." "From Samara Province, Russia. (No. 201.) As found wild in Samara Province. See No. 206 (S. P. I. No. 20726). (Hansen). B. P. I. Bulletin No. 132.

South Dakota No. 50. S. P. I. No. 20722. "Russian." "From Saratov Province, central Volga River region of eastern Russia, adjoining Siberia. (No. 202.) As found wild in Saratov Province. (Hansen.)" B. P. I. Bulletin No. 132.

South Dakota No. 754. S. P. I. No. 29139. "Kashmir." "From Lahul, in the heart of the Himalayas, near Kashmir. 'Lahul is a valley 10,-

000 to 11,000 feet above the sea, surrounded by glaciers and snowy mountains and covered with snow during the winter months'." B. P. I. Bulletin No. 227.

South Dakota No. 765. S. P. I. No. 28938. "Turkey." "From Aintab, Turkey, Asia. Presented by Mr. H. H. Bakkalian, secretary to Mrs. F. A. Shephard. Received October 19, 1910." B. P. I. Bulletin No. 227.

South Dakota No. 767. S. P. I. No. 31649. "Indian" "Boole Bu-Kusk, from Iskardo. This variety once cultivated remains for at least three or four years. If it is given to animals when green, it swells their stomachs. Its flower is yellow in color, and its plant is larger than that of the preceding number, but animals do not like it as well." B. P. I. Bulletin No. 248.

South Dakota No. 55. "Orenburg." "This is No. 261 of my third tour to Siberia, 1908. This is Medicago falcata grown from seed gathered for me from plants growing wild in the dry steppe region at Orenburg Province, in the extreme border of European Russia. Summer heat of 98 degrees above and winter cold of 33 degrees below zero Fahrenheit are not uncommon. The annual rainfall at Orenburg is a little less than 16 inches. We find there is a small proportion of blue-flowered plants in this lot, both blue and yellow-flowered alfalfa found in this region, but they can easily be separated; the blue-flowered would then naturally be of the Turkestan alfalfa group." N. E. Hansen in S. D. Bulletin No. 141, page 119.

South Dakota No. 645. S. P. I. No. 32412. "Russian." "From Krassny Koot Samara Government Russia (No. 1714a, November 29, 1911.) This seed was presented by Mr. W. S. Bogdan.

Among it there are all possible types, and it is recommended, therefore, for general naturalization purposes, and should be sown in a dry northern locality for the selection of promising types. (Meyer)''. B. P. I. Bulletin No. 282.

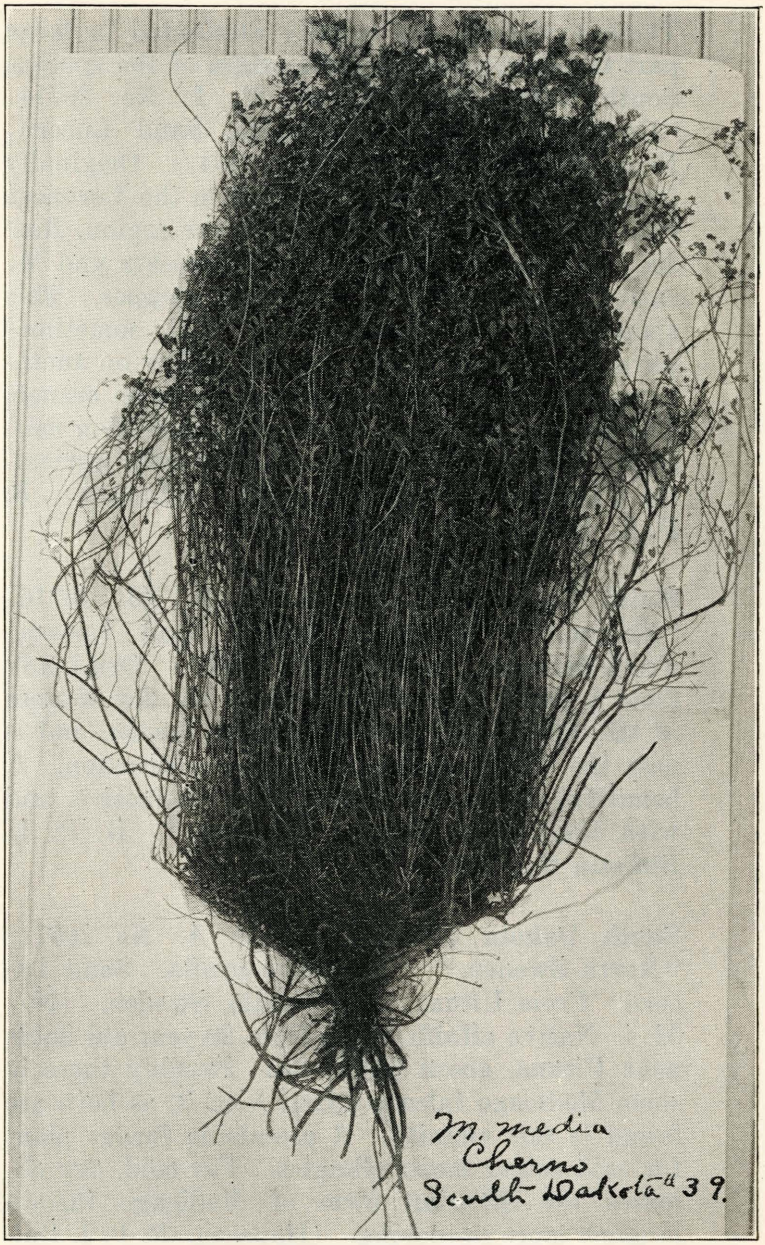
South Dakota No. 648. S. P. I. No. 30200. ''Austrian.'' ''Collected in 1909 from specimens growing wild in lower Austria. Presented by Dr. Weinzirl, Director, Imperial Seed-Control Station, Vienna, Austria. Received March 17, 1911. Siberian alfalfa.'' B. P. I. Bulletin No. 233.

South Dakota No. 769. S. P. I. No. 30009. ''Indian.'' ''From Quetta, British India. Purchased through Mr. F. Booth Tucker, Salvation Army, Simla, India. Received March 7, 1911.'' B. P. I. Bulletin No. 233.

MEDICAGO MEDIA:

Numerous strains of alfalfa appear to be natural hybrids between M. sativa and M. falcata. Upon this assumption the species has been named Medicago media. All of the strains vary greatly, that is, the characters of the several plants within the species are not constant. Blossoms vary in color, leaves vary in size and shape, and abundance.


M. media
Cossack
South Dakota 38


M. media
Cherno
South Dakota 39.

These variations are usually attributed in large part to the supposed hybrid origin of the species. South Dakota No. 38. S. P. I. No. 20714. "Cossack." "Medicago media, Sand Lucern. From Moscow, Russia. (No. 194.) Originally from a single plant growing wild in the Voronesh Province of the central Volga River region, Russia. It is a natural hybrid of M. falcata and M. sativa and found wild in the dry steppes. This spontaneous or natural hybrid will sometimes have blue flowers on one branch, yellow on another and sometimes both colors on the same branch. The present sample is the fourth generation raised by Professor Williams at the Moscow Agricultural College and is his 571x572. (Hansen.) B. P. I. Bulletin No. 132.

South Dakota No. 39. S. P. I. No. 20716. "Cherno." "Medicago media, Sand Lucern. From Moscow, Russia. (No. 196.) Originally from a single plant found wild in the dry steppes of the Voronesh Province, eastern Russia, and is now the fourth generation under cultivation. A beautiful plant, very hardy, very productive, and with black-green flowers. (Hansen)". B. P. I. Bulletin No. 132.

South Dakota No. 54. S. P. I. No. 20571. "North Sweden." "Medicago media. Sand Lucern. From Ultuna, near Upsala, Sweden. (No. 51.) Native alfalfa taken from 20-year-old fields near Ultuna, about 60°N. lat. Possibly there is some Medicago falcata mixed with it, as both are found in this vicinity. A promising forage plant for cold rather moist climates. For cold, dry climates the Siberian form of Medicago falcata is much more promising. (Hansen). B. P. I. Bulletin No. 132.

South Dakota No. 918. S. P. I. No. 20896. "French." "Medicago media. Sand Lucern. From Paris, France, April 25, 1907. Received through Vilmorin, Andrieux & Company." David Fairchild.

South Dakota No. 919. S. P. I. No. 24603. "German." "Medicago sativa varia. From Erfurt, Germany. (P. L. H. No. 3353.) Secured by Mr. G. Schulze, civil engineer, Altenkirchen, Westerwald, Germany, and presented by Mr. Paul Schulze, Chicago, Illinois, through Mr. Chas. J. Brand. Received January 22, 1909. Sand Lucern." B. P. I. Bulletin No. 162.

MEDICAGO RUTHENICA:

Medicago ruthenica is a species of about equal size of growth as the spreading type of Medicago falcata. The seed pods are flat, and oval, tapering toward both ends, and each containing as a rule, not over four seeds. Leaves small, narrow but numerous.

South Dakota No. 35. S. P. I. No. 24451. "Gobi Desert." "Medicago ruthenica No. 59. From same source as S. P. I. No. 24456. This is a favorite wild forage for the stock kept by the Mongolian nomads of this region. It should be tested in the driest, coldest, parts of the Northwest, especially where the most extreme cold comes at times without snow on the ground. For a common name, Gobi Desert, Mongolian or Eastern Siberian alfalfa will do."

"Distribution: a native of stony and sandy regions of Siberia, extending east to the region of Lake Baikal, and into China. (Hansen.)" B. P. I. Bulletin No. 162.

MEDICAGO PLATYCARPA:

Medicago platycarpa is perennial with yellow flowers and flat pods. The stems are hard, smooth and almost trailing.

South Dakota No. 37. S. P. I. No. 24457. "Siberian." "No. 73. A strong growing perennial yellow-flowered alfalfa found wild in timber, clearings and along edges of the forests in Central Siberia. The name platycarpa refers to the large flat pod. This alfalfa should be thoroughly tested in regions like Northern Wisconsin and Minnesota. Will endure extreme cold, but probably not severe wind sweep as well as Medicago falcata and Medicago ruthenica. This lot was gathered near Chylim between Obb and Omsk, in the Tomsk Province, Western Siberia. All the three Siberian alfalfas are yellow-flowered."

"Distribution: Found throughout Siberia, extending east as far as Lake Baikal. (Hansen.) B. P. I. Bulletin No. 162.